

## SOIL SURVEY OF MARION COUNTY, ALABAMA.

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### DESCRIPTION OF THE AREA.

Marion County comprises an area of 472,896 acres, or approximately 739 square miles, and its outline is roughly that of an inverted L. It is situated in the northwestern part of Alabama, joining the Mississippi line. It is bounded on the north by Franklin County, on the east by Winston and Walker counties, on the south by Fayette and Lamar counties, and on the west by Lamar County and Mississippi.

The entire county is rough and hilly. In the southern and southwestern parts the hills are relatively low and rounded in outline, but in the central and northern parts the surface is rough and broken, some portions being almost mountainous.

The greater part of the county is drained by the Buttahatchee River and its tributaries. Bull Mountain Creek flows across the northwestern part, and the southeastern part is drained by Luxapalilla Creek, Little New River, and New River. These streams all reach the Gulf of Mexico

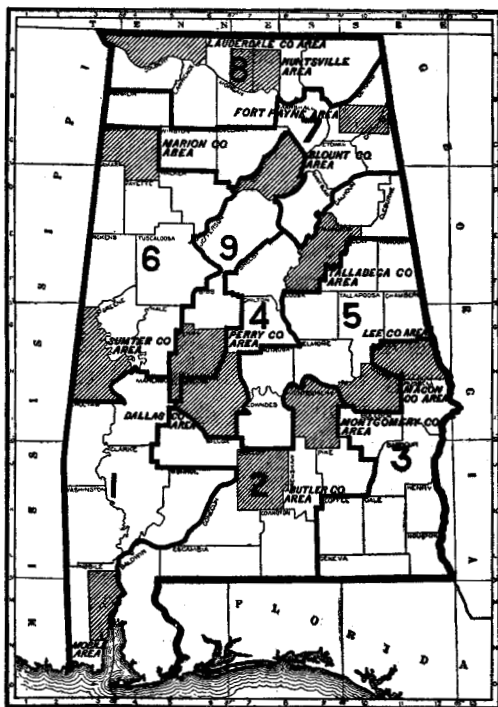


FIG. 12.—Sketch map showing location of the Marion County area, Alabama.

through the Tombigbee River. A small portion of the county in the northeastern corner is drained by Bear Creek, which flows north to the Tennessee River. Nearly all of these streams have their source within the county. The large streams, especially Buttahatchee River

and Bear Creek, have swift currents and flow through deep, narrow valleys, making it possible to develop much water power.

The county was organized in 1818, and the first settlements were made a few years earlier. Owing to the long distance from any market town or shipping point and the general rough character of the country, its settlement was slow. A few families came in from year to year and took up land along the creeks where there was easy access to water, until scattered settlements were found over the entire county. The majority of these early immigrants came from the older States of Tennessee, North Carolina, and South Carolina. During the last twelve or fifteen years there has been a new immigration from the eastern counties of the State and from Georgia. These people for the most part have settled in the northeastern part of the county, selecting their farms on the tops of the broad, dividing ridges, where the land is less broken and can be cultivated with greater ease.

Marion County is still sparsely settled, not more than one-fourth of its area being occupied. There are no large towns. Hamilton is the county seat, with a population of about 500, and is situated near the center of the county some 16 miles from a railroad. The west Alabama Agricultural School was established here several years ago, and at the present time has a large enrollment of students from this and adjoining counties. Guin and Winfield are somewhat smaller villages, in the southern part of the county, on the St. Louis and San Francisco Railroad. Bear Creek is in the northeastern part, on the Northern Alabama Railroad, and furnishes a third shipping point. Hackleburg, Bexar, and Shottsville are other interior trading points.

During the early history of the county all supplies had to be hauled in from shipping points a long distance away—at first from Eastport, on the Tennessee River, and later, as railroads were built, from Iuka, Columbus, and Aberdeen, Miss. In 1887 the St. Louis and San Francisco Railroad was built across the southern part of the county, and about the same time the Northern Alabama Railroad crossed the northeast corner. The Illinois Central Railroad is now constructing a line across the northern part of the county, which will doubtless be in operation before the close of 1907. These lines make the shipping facilities much better than they have been, but the farmers in the central part of the county must still haul their produce 12 to 20 miles to reach a railroad.

The public roads are such as are usually found in an undeveloped region. Most of them follow the crests of ridges, so as to avoid the steep hills encountered in crossing stream valleys. They are worked over each season to the extent of filling up washed-out places, and the drainage ditches are cleaned out, so as to conduct the surface water to one side instead of allowing it to flow down the

wheel tracks and gully them. Over most of the county the region between the public roads is traversed by a network of settlement roads by which the people reach their homes. An abundance of good gravel is found at intervals over the county. If properly applied, this would make splendid roadbeds and the highways of Marion County could be put in excellent condition at a minimum cost.

Birmingham and Memphis are the nearest large cities, the former being 80 miles southeast and the latter 170 miles northwest of the county. Most of the supplies used in the county are shipped from these cities, and they ultimately receive a considerable part of the cotton, though it is sold by the grower in the local markets.

#### CLIMATE.

The climatic conditions in this county are very favorable for general agriculture and make it possible to grow a large variety of crops. The summers are long and warm, the growing season extending over a period of about seven months. Very little extreme heat is experienced, although the thermometer sometimes rises above 90° F. The winters are short and mild. Snow falls occasionally, but usually remains on the ground only a short time. The temperature rarely falls to zero or below.

The appended table, compiled from records of the Weather Bureau stations at Hamilton and Tuscumbia, Ala., and Columbus, Miss., gives the normal monthly and annual temperature and precipitation. The dates of the last killing frost in spring and the first in fall are given for Hamilton only.

Hamilton, as heretofore stated, is situated near the center of Marion County; Tuscumbia is 30 miles north, and Columbus, Miss., about 40 miles southwest of the area. The data from these three points show that there is but little variation in the climatic conditions over this section of the country. The rainfall is ample and quite uniform during the growing season, so that there is little danger of crops suffering from drought.

*Normal monthly and annual temperature and precipitation.*

Month.	Hamilton.		Tuscumbia.		Columbus, Miss.	
	Tempera- ture.	Precipi- tation.	Tempera- ture.	Precipi- tation.	Tempera- ture.	Precipi- tation.
	°F.	In.	°F.	In.	°F.	In.
January.....	41.7	4.83	40.2	4.92	44.2	4.77
February.....			43.5	4.78	44.6	5.00
March.....			52.7	6.80	53.8	7.00
April.....	59.9	5.09	62.0	5.18	62.2	4.77
May.....	71.5	2.57	71.0	3.00	72.8	3.16
June.....		5.00	79.6	4.30	81.3	4.76
July.....	79.8	4.54	78.7	4.43	83.2	5.60
August.....	80.0	2.78	78.2	3.50	81.9	3.72
September.....	76.0	2.79	70.0	2.97	76.1	2.55
October.....	62.4	2.48	62.0	2.10	63.9	2.06
November.....	52.2	3.80	52.9	3.34	53.7	4.79
December.....	46.1	4.55	43.8	4.38	46.6	5.25
Year.....			61.2	49.70	63.7	53.43

*Dates of first and last killing frosts at Hamilton.*

Year.	Last in spring.	First in fall.	Year.	Last in spring.	First in fall.
1897.....	Apr. 17	Oct. 25	1902.....	Apr. 2	Oct. 29
1898.....	Apr. 7	Oct. 21	1903.....	Mar. 26	Oct. 19
1899.....	Apr. 7	Nov. 2	1904.....	Apr. 4	Oct. 23
1900.....	Apr. 13	Nov. 12	Average.....	Apr. 6	Oct. 28

## AGRICULTURE.

The early agriculture of Marion County was somewhat primitive, but included a greater variety of products than at present. Transportation facilities were wholly lacking, except for the old-time ox cart. The nearest shipping points were 40 or 60 miles distant, so that there was no inducement to produce more than was needed for home consumption. The first settlers made small clearings in the forests, where they cultivated corn and wheat and a few vegetables for their own use, and depended largely on wild game for their meat. As the settlements became more numerous live stock was introduced, the cattle and hogs running at large in the woods, in some cases becoming almost as wild as the native game. A few sheep were kept to furnish wool, from which the homespun garments were made. As land was cheap and abundant the farmer made no effort to keep it in a high state of cultivation, for as soon as a field became unproductive it was abandoned and another piece of land was cleared.

These general conditions remained much the same up to the time of the civil war. A few large plantations were established in the western part of the county, where slaves were kept and cotton was

grown for the market, but this was by no means general. During the last forty years, as the railroads came closer, so that shipping points could be reached with less and less trouble, there has been a gradual change. The production of wheat has been practically abandoned. The area of cultivated land has increased, and there has been a steady increase in the acreage planted to cotton, which has become the principal money crop. Corn is next in importance, nearly every farmer planting a portion of his land to it. However, many of them do not produce enough corn for their own use, preferring to grow a greater acreage of cotton and to make up the deficiency by purchase. Corn to supply this demand is shipped in from outside points at a heavy cost to the consumer. Oats are grown to a limited extent for home use, and a few farmers sow cowpeas each year. Much more attention should be given to the growing of cowpeas, as it is a valuable forage crop and is beneficial to the land. Nearly every farm has its garden, where sweet potatoes, tomatoes, cabbage, and other vegetables are grown. Peaches, apples, grapes, and small fruits are cultivated for home use, no attempt being made to produce them for market. With better shipping facilities peaches and grapes would prove profitable crops.

The live stock in the county consists almost entirely of mixed breeds. Nearly every farmer keeps a few hogs and one or two cows. Some of them, however, do not raise pork enough for their own use. A few have small flocks of sheep. Very little surplus stock is produced, although during the last year or two a few steers have been bought and shipped to Georgia for feeders. Throughout most of the county cattle and hogs range at will over the unoccupied land. Recently some of the "beats" in the county have been enforcing the stock law and preventing stock from running at large.

The adaptation of soils to crops has not as yet received much consideration, and practically the same crops are grown and the same methods of cultivation practiced over the entire county, without regard to the differences in the soil. It is the same with rotation of crops, a common practice being to grow the same crop on a field for several seasons. Some of the farmers plant corn and cotton alternately. Occasionally cowpeas are planted between the rows of cotton and corn and are gathered for hay or pastured after the corn is harvested. It is the custom after the field has been tilled for several seasons to let it lie fallow for two or three years. Frequently the surface is left unprotected and the land is damaged by washing. When this happens usually no attempt is made to reclaim it, the field being thrown open to the commons.

The preparation of the land for crops and its subsequent cultivation are done very largely with one horse. A light plow, consisting of a frame to which a variety of points or shovels may be attached,

is used throughout the season. The preparation of the land usually begins in January or February and continues until planting time. The soil is thrown up in a series of ridges, on which the rows of the next season's crop are planted. In most cases this is accomplished by throwing four furrows together, two from each side, with a light turning plow. Sometimes only two furrows are turned and the middle of the row is left to be broken up when cultivation begins. During the latter part of March or the first of April commercial fertilizer at the rate of 200 to 300 pounds per acre is drilled in the rows, and a few days later the seed is planted. This is the general practice for both corn and cotton. Two-horse turning plows, disk harrows, and other improved implements are being introduced gradually. Where these are used the land is generally plowed and harrowed in the usual way. In some cases the large plow is used to throw up the ridges, much the same as with the lighter implements. During the last few years the practice of contour cultivation and terracing the land has been introduced and has now become quite general. On the steep hillsides the soil washes easily, but the practice of contouring and terracing in a large measure prevents damage from this cause.

The labor problem does not assume the importance in Marion County that it does in many sections. The population is mainly white, and most of the farmers own the land they till. A few years ago considerable land was farmed by tenants, but in late years the tenant class has sought employment in the mines, on the railroads, and on public works, and at the present time little land is rented. Very few farmers attempt to cultivate a larger area than they can conveniently care for with the assistance of their own families. Most of the land is held in tracts of 160 acres or more, and of this usually not more than 30 or 40 acres are under cultivation. According to the census of 1900 less than 17 per cent of the area of the county was improved land. The acreage of cleared land has increased somewhat since then, but will not exceed 20 per cent at the present time. Agricultural land is cheap. The best improved farms will not bring more than \$30 an acre, and much of the improved land can be bought for \$10 to \$15 an acre. Large tracts of unimproved land suitable for agriculture can be bought at \$2 to \$5 an acre.

The conditions found in Marion County are much the same as those existing in any region partly developed, where land is cheap and plentiful. The methods employed are necessarily somewhat wasteful and tend to deteriorate the soil. Marked improvement can be made by the general use of improved machinery, more thorough cultivation, and systematic rotation of crops. Where one horse is used in preparing the land, improved implements will make it possi-

ble to employ two to four horses, and thus to accomplish much more work without extra help. Deeper plowing and more thorough cultivation will, even when the cost of the extra labor is considered, give larger profits. The practice of cultivating the land in ridges is necessary on the hillsides to prevent washing, but where the surface is level or only gently rolling level cultivation is better for both cotton and corn. The practice of contour cultivation and terracing on the hillsides is to be commended and should become universal.

Good farming demands a systematic rotation of crops, that is, changing the crop on a given field from year to year. A rotation which has been recommended for the State and which would doubtless prove satisfactory for Marion County is as follows: First year, corn with cowpeas planted between the rows at the last cultivation, the cowpeas to be pastured or plowed under; second year, the land plowed and sowed to oats, the oats to be followed, as soon as harvested, by cowpeas, which may be cut for hay or allowed to ripen and the peas gathered for seed; third year, cotton. The cowpeas will add organic matter and nitrogen—taken from the air—to the soil, leaving it in much better condition for subsequent crops.

More and better live stock should be kept. This should be confined to the farm instead of being allowed to run at large. A large quantity of animal manure can thus be added to the soil, and this will take the place of, or at least supplement, the commercial fertilizer now used. In order to carry much stock on the farm of average size, more forage crops must be grown. Cowpeas and alfalfa are two important crops in such a system. Alfalfa makes a splendid hay and a satisfactory pasture crop. It has been tried in the county and does well where the land is first treated with lime. The general introduction of this one crop will add much to the income of the farmers of Marion County.

#### SOILS.

The soils of Marion County are for the most part of sedimentary origin. The county lies near the southwestern extremity of the Cumberland Plateau, at a point where the Coastal Plain sediments of the Tertiary Period—mainly the Lafayette formation—form a thin covering over the sandstones, shales, and coal seams of the Carboniferous period which make up the plateau. The rocks here dip to the southwest. They lie near the surface in the northeastern and eastern parts of the county and are exposed along the hillsides and at the bottom of the valleys. Passing to the west and south, the overlying drift increases in thickness until all trace of the underlying rocks is lost. The Coastal Plain material laid down along the margins was subject to varying influences during the period of deposition. Because of this the soil-forming material varies widely. In many

places thick beds of gravel were formed, while at other points, presumably representing quiet bays, fine material was deposited, resulting in the formation of loam and fine sandy loam. Some of the gravel beds were cemented with iron, forming a conglomerate. At other points a brown sandstone highly impregnated with iron was formed. Farther out the deposition was more uniform, giving rise to the interbedded sands and sandy clay characteristic of the Gulf Coastal Plain. Since the final recession of the gulf waters stream erosion has been active and the county now presents a rough, hilly appearance.

These conditions have resulted in forming 10 distinct soil types: Guin fine sandy loam, Guin stony sandy loam, Guin gravelly sandy loam, Glenn loam, Glenn sandy loam, Norfolk silt loam, Ocklocknee fine sandy loam, Ocklocknee sand, Dekalb clay, and Rough stony land.

The Guin fine sandy loam is the most extensive. It is the predominant type throughout the southern and western parts of the county. Smaller areas are found along the ridges over the entire county. In the central and southern parts of the county there are several large areas where the country is very rough and broken, and there has been an accumulation of fragments from the brown sandstone or iron crust at the surface, making the soil quite stony. This has been mapped as a separate type under the name of Guin stony sandy loam.

Closely associated with the Guin fine sandy loam in the central and northern parts of the county is the Guin gravelly sandy loam. This usually occupies the hillsides below the Guin fine sandy loam, but in some cases the latter soil is lacking and the gravelly sandy loam extends over the entire hill. North of Guin the gravelly sandy loam forms a cap to the ridges, with the Guin fine sandy loam below. The Glenn loam is another sedimentary soil found in the northern and eastern parts of the county. It occupies the tops of broad ridges between the larger streams. Extending across the eastern part of the county is a rough, broken strip of country where the Coastal Plain sediments constitute a thin covering over the underlying rocks, and in many cases the disintegrating of the sandstone has influenced the soil. The greater part of this section is occupied by the Glenn sandy loam. Associated with this type are areas of shale from which the overlying sediments have been removed. The weathering of the shale has formed the Dekalb clay.

After the final recession of the Gulf waters the streams were quite active and terrace and bottom lands were formed along their courses. This gave rise to three soil types—the Norfolk silt loam, which occurs as a terrace along Buttahatchee River and some of the other streams, and Ocklocknee fine sandy loam and Ocklocknee sand, found in the



bottoms. In many places in the northern part of the county the streams have cut down into the underlying rocks and their courses are lined by sandstone cliffs or steep bluffs strewn with boulders and fragments of sandstone. These areas were mapped as Rough stony land.

Lying at the junction of the geologic formations belonging to the Carboniferous and Tertiary periods, some of the soils found here owe their origin to the blending of material from both sources, while those derived wholly from sedimentary deposits were laid down under conditions somewhat different from those existing farther from the boundary line. Therefore the types are less uniform in this county than in regions where the formative processes have been less variable. These conditions have made it necessary to consider several of the types as having only a local distribution, while those correlated with the soils mapped in other areas vary somewhat from the true type.

The following table gives the names and areas of the several soil types shown in the accompanying map:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Guin fine sandy loam.....	181,824	38.5	Dekalb clay.....	23,808	5.0
Glenn sandy loam.....	73,600	15.6	Norfolk silt loam.....	17,216	3.6
Guin gravelly sandy loam.....	69,056	14.6	Rough stony land.....	14,272	3.0
Glenn loam.....	35,584	7.6	Ocklocknee sand.....	960	.2
Ocklocknee fine sandy loam.....	28,544	6.0	Total.....	472,896	
Guin stony sandy loam.....	28,032	5.9			

#### GUIN FINE SANDY LOAM.

The Guin fine sandy loam is a fine sandy loam 8 to 16 inches deep, with an average depth of about 10 inches. The surface over the greater part of the type is light brown or gray in color, frequently taking on a yellow or yellowish-brown tint below 2 inches. In some local areas the soil is decidedly red. The subsoil to a depth of 36 inches or more is usually a brownish-red sandy clay, but in some cases is orange or yellow and in others distinctly red. The sand content is somewhat variable, ranging from a mere trace to a quantity sufficient to give the subsoil the characteristics of a loam rather than a sandy clay. A small quantity of waterworn gravel is usually present in both soil and subsoil, and fragments of iron crust are occasionally encountered.

This is the most extensive soil type in Marion County. Except where broken by bottom lands or gravel ridges, it occupies all of the western half of the county and extends eastward along the southern boundary to within 6 miles of the east line. North of this occur

some large areas, while a few smaller ones are found scattered over the eastern range of townships.

The surface of the Guin fine sandy loam for the most part is hilly, and in some cases rough and broken. This is particularly noticeable around the headwaters of Beaver, Dugan, and Woods creeks. In the northern part of the county it occurs on the broad, rolling tops of the dividing ridges between Bull Mountain Creek, Bear Creek, and North Fork. The surface slope is always sufficient to provide ample drainage, and over the greater part of the type care must be taken to prevent excessive soil washing. The soil is derived from the stratified beds of clay and sand belonging to the Lafayette formation, which extends over the greater part of the county.

In its virgin state this soil was covered with a timber growth consisting mostly of oak and hickory, with scattering pine. Where it has been cleared and left in "old fields" the pine has sprung up more quickly than the other trees and occupies the whole field. The sandy character of the surface soil makes it an excellent soil for truck crops, small fruits, and peaches. Cotton and corn are the principal crops, and oats are an important, though secondary, product. Cotton yields from one-third to one-half bale per acre, though with good cultivation even better results can be obtained. Corn will produce 20 to 25 bushels per acre, and the yield of oats is about the same. Cowpeas are grown to a limited extent and prove a very satisfactory crop. Excellent results have been obtained with alfalfa where a dressing of lime was first applied to the soil.

The Guin fine sandy loam varies widely in value, owing mainly to the difference in topography. Improved farms can be purchased at from \$10 to \$30 an acre. Unimproved land sells at \$2 to \$5 an acre.

The average results of mechanical analyses of samples of this soil type are given in the following table:

*Mechanical analyses of Guin fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16850, 16854-----	Soil-----	0.5	9.2	8.9	35.5	11.3	25.7	9.0
16851, 16855-----	Subsoil----	.9	7.1	6.8	28.4	5.5	24.1	26.9

#### GUIN STONY SANDY LOAM.

The soil and subsoil of the Guin stony sandy loam differ but little from the Guin fine sandy loam, the separation into a distinct type having been made because of its rough, broken topography and the presence of large quantities of iron crust and gravel conglomerate on the surface. This stony material has been formed by the accumulation of iron salts in certain strata of the soil, which has resulted in

the cementing of the gravel and sand into blocks or crusts varying from a few inches to 2 or 3 feet in width.

This soil type is found in the southern and central parts of the county, with one large area in the northwestern part near Bull Mountain Creek. The surface of the Guin stony sandy loam is rough and hilly. Most of the areas occur around the heads of stream courses and on steep, narrow ridges, where erosion has been very active. This has resulted in the removal of large quantities of the fine material, leaving an accumulation of iron crust and coarse material at the surface.

Little of this soil has been cleared, the greater part being covered with the original growth of oak, hickory, other hardwoods, and pine. Its rough, broken surface makes it difficult to cultivate and causes excessive erosion when cleared. With the present low land values in this region, this soil should be left in forest, as larger returns may be obtained from the timber than could be had if the land were improved.

#### GUIN GRAVELLY SANDY LOAM.

The soil of the Guin gravelly sandy loam, from 8 to 12 inches in depth, is a light brown or gray sandy loam. The subsoil has about the same texture as the soil, and is usually yellow or gray, but in some cases red in color. The red color, however, is not as general as in the Guin fine sandy loam. Both soil and subsoil contain a large quantity of waterworn gravel. In some cases this may constitute 60 or 70 per cent of the soil mass.

This type is found principally in the central and northern parts of the county, where it occupies large areas. Small areas are scattered over the entire region occupied by the Guin fine sandy loam, many of them being only a few acres in extent and too small to show in the map.

The material from which this soil is derived consists of gravel beds laid down with the sands and clays of the Lafayette formation. In some cases the deposits occur as small pockets or lenses, while in others they represent extensive areas laid down as a shallow water or shore deposit. North of Guin the type occurs on the tops of ridges above the Guin fine sandy loam. Here it has served as a cap of resistant material, forming long, narrow, irregular, steep-sided ridges. Farther north the gravel beds are found as the lowest member of the Lafayette formation, resting on the Carboniferous sandstone and shales. The streams of this part of the county have cut through to the underlying rocks, often eroding them away, and the gravel areas form the steep valley walls, while above them are broad-topped ridges of Guin fine sandy loam.

Along Bull Mountain Creek the beds of gravel were partly cemented and have resisted the erosive action of the water much the

same as the solid rock. Along the north side of the valley there is an almost continuous line of gravel bluffs. The south side is more broken and stands out as individual hills and ridges.

Owing to position and texture, the soil water is rapidly removed from the Guin gravelly sandy loam and the soil is apt to suffer from drought. Where the surface is not protected it is badly damaged by erosion.

The greater part of the Guin gravelly sandy loam is still covered with the original forest growth, consisting largely of oak. In the less broken sections some of the type has been put under cultivation. Fair returns are obtained for two or three years, until the supply of humus in the surface soil is exhausted; then the fields are abandoned, and frequently waste by washing. Cotton will produce about one-fourth bale, and corn 10 to 15 bushels per acre. Grapes do well in this climate and doubtless would make satisfactory growth on this soil. However, most of the type should be left in forest.

#### GLENN LOAM.

The surface soil of the Glenn loam varies from a heavy fine sandy loam to a loam or silty loam, with an average depth of about 10 inches. The first inch is gray or grayish yellow; below that the color varies from a light yellow to a brownish yellow. The subsoil is a compact yellow loam, sometimes mottled with gray below 24 inches.

This soil is found in the northern and eastern parts of the county. In the northern part it occurs as irregular areas on the tops of the broad dividing ridges which separate the headwaters of North Fork, Williams Creek, and Bull Mountain Creek. In the vicinity of Bear Creek it occupies a broad, level to gently rolling area 1 to 3 miles wide, extending east and west for about 7 miles along the north county line. Several other large areas having the same topographic features are found south of this in the two eastern tiers of townships. The elevated position of the Glenn loam insures good natural drainage, but the surface water is carried off less rapidly than from any other upland soil in the county; hence little damage is done by erosion.

This type of soil is derived from weathered Coastal Plain sediments belonging to the Lafayette or possibly a more recent formation. In the vicinity of Bear Creek the material forms only a thin covering over the Carboniferous sandstone. Frequently the rock is encountered at a depth of 4 to 6 feet, and may have exerted some influence upon the character of the soil.

The timber growth on the Glenn loam consists of oak and hickory. As the forest is less dense, the native grasses make better growth than on the other soils of the county. Near Bear Creek practically all of the soil has been improved. In other sections of the county

the greater part is still forest. With proper cultivation the crop yields are as good on this soil as on any other. Cotton, corn, and oats are the principal crops grown. Cotton produces a half bale and corn 25 bushels per acre and oats about the same quantity. Apple trees make a strong, vigorous growth and produce a fruit of good quality. Peaches do not do well on this soil.

The close structure of this soil makes deep plowing necessary to obtain the best results. The plowing should be to a depth of 8 or 10 inches in order to produce a deep, friable seed bed. Cowpeas or some other crop for green manure should be plowed under every two or three years to add organic matter to the soil, making it easier to maintain a mellow, porous surface mulch. Where this has been done the Glenn loam in crop yields compares favorably with the best soils of the county.

The average results of mechanical analyses of this type of soil are shown in the following table:

*Mechanical analyses of Glenn loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16254, 16832, 16834.	Soil-----	0.3	3.3	7.6	19.7	3.1	54.3	11.6
16255, 16833, 16835.	Subsoil----	.4	3.1	5.7	17.0	2.8	51.0	19.6

#### GLENN SANDY LOAM.

The soil of the Glenn sandy loam has an average depth of 12 inches, and varies from a loamy sand to a light sandy loam of gray or grayish-yellow color. The sand constituents range from the medium to the fine grades. At 12 or 14 inches the subsoil is reached. This is a yellow sandy loam somewhat heavier than the soil, or in some cases a true loam. It is usually mottled with gray and is more sandy below 30 inches. The fine material contained in this soil is usually sufficient to make it somewhat sticky when wet. In several places narrow strips of small, waterworn white gravel are found in the fields.

In the southeastern part of the county a phase of this soil differing slightly from the description was found occupying the tops of a few ridges. It consists of a fine sandy loam, having a brick, orange, or dark red sandy clay subsoil. It is more productive than the main type. The largest area of this phase occurs along the Tuscaloosa road north of Texas.

The Glenn sandy loam occupies an irregular belt several miles in width extending nearly across the county north and south near the east line. Smaller areas are found along Bear Creek and North

Fork and around the headwaters of Bull Mountain and Williams creeks. This section of the county is rough and broken, and the Glenn sandy loam is found in nearly all positions. Several large creeks have their origin here and are separated by long, narrow, dividing ridges. In some cases the Guin fine sandy loam or the Glenn loam forms a cap along the crests of the ridges, with the Glenn sandy loam occupying the slopes of the ridges and bottoms of the valleys. In other cases the Glenn sandy loam extends over the ridge, occupying the entire region. Owing to its position, the surface drainage is good. Moreover, the loose, open structure of this soil allows water to flow through it more readily than through the other soils of the area, and the surface is not injured by erosion to so great an extent. For the same reason the soil water is removed more quickly and it is the first soil to suffer from drought.

This soil is derived mainly from a thin layer of Coastal Plain material laid down over sandstone. The underlying rock has weathered to some extent, so that the soil is a mixture of two distinct materials. On the steep hillsides sandstone fragments are frequently found strewn over the surface.

The forest growth consists largely of white, post, and black-jack oak, with a few scattering pines. Very little of the soil is under cultivation. Cotton and corn are the principal crops, as in other sections of the county. The yields obtained are light and uncertain, and very little can be done without the use of commercial fertilizers. Potatoes, peanuts, and some of the truck crops would give the best returns on this soil. Peaches will do fairly well, but not as well as on the Guin fine sandy loam. The greater part of the Glenn sandy loam should be kept in forest, as the timber cut from time to time would be of greater value than the crops that can be produced on it.

The average results of mechanical analyses of this soil type are given in the following table:

*Mechanical analyses of Glenn sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16846, 16848-----	Soil-----	0.1	12.4	18.1	25.9	2.0	32.8	8.5
16847, 16849-----	Subsoil---	.1	13.2	17.8	25.3	2.3	26.6	14.7

NORFOLK SILT LOAM.

The Norfolk silt loam consists of 8 to 10 inches of light-brown or yellowish-brown silt loam, resting on a subsoil which is a yellow silt loam, becoming below 30 inches more sandy and sometimes mottled with gray. Local areas contain some small gravel in both soil and subsoil.

This is one of the types of limited development in Marion County. The largest areas are found along Buttahatchee River and its tributaries south and east of Hamilton and along New River and Little New River in the southeastern part of the county. A few small areas are found on Sipsey and Bull Mountain creeks in the western part of the county.

The Norfolk silt loam along the Buttahatchee River occupies a nearly level terrace, having an elevation of 30 to 50 feet above the river. In the unimproved areas of the soil the drainage courses are clogged with brush and decaying leaves, and this retards the flow of water, which stands on the surface and keeps the soil in a saturated condition. Where the land is improved and the stream channels are kept open the surface water is quickly removed and ample drainage is insured. Where the Norfolk silt loam occurs adjacent to the creeks in the western and southeastern parts of the county, there is no well-defined terrace as along the Buttahatchee River and the surface is somewhat more sloping, furnishing even better drainage than is found near the river.

This soil consists of alluvial material deposited by adjacent streams at a time when they occupied a higher elevation. It is derived largely from reworked Lafayette material.

The native timber growth consisted largely of oak, though hickory, elm, beech, and other hardwoods were found in limited numbers. At present most of the type is under cultivation. It is fully as productive as any soil in the county, and its level topography makes it a very desirable soil for farming. Cotton, corn, and oats are the principal crops. Cotton produces about one-half bale per acre, and under favorable conditions as much as 1 bale per acre has been grown. Corn yields 20 to 30 bushels per acre and oats about the same quantity.

The unimproved land is valued at \$5 to \$10 an acre, while the improved farms are worth \$15 to \$35 an acre.

The average results of mechanical analyses of the Norfolk silt loam are given in the following table:

*Mechanical analyses of Norfolk silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16842, 16844-----	Soil-----	0.7	5.9	10.2	12.9	3.3	55.5	11.4
16843, 16845-----	Subsoil----	.6	5.4	9.0	11.7	1.9	55.0	16.1

OCKLOCKNEE FINE SANDY LOAM.

The Ocklocknee fine sandy loam is a bottom-land type found along the streams of Marion County. Owing to its origin and position,

the soil is somewhat variable. The predominant phase consists of a light-brown or gray fine sandy loam about 10 inches deep, usually containing enough clay to make it sticky when wet. The subsoil is a light-gray or mottled fine sandy loam or loam. Along the small streams the soil is quite sandy, while the areas along the larger streams are more loamy.

Large areas are found along Bull Mountain, Sipsey, Beaver, and Luxapalilla creeks. Smaller areas are found along the creeks in the western and southern parts of the county. Along Sipsey Creek the bottom is half a mile or more in width. Here both soil and subsoil are ashy gray in color and the subsoil is frequently somewhat silty.

Near the small creeks and branches the surface of the Ocklocknee fine sandy loam slopes gently toward the stream course, but where it is adjacent to the large streams it is usually quite level. Some of these areas in their unimproved state are semiswampy. Most of them can be drained with little difficulty after the land is cleared. A few places are so low that it is not practical, however, to attempt drainage. In some cases the wash from the adjoining hills has been directed into these low places, filling them with sand. These areas are very productive. The soil has been formed from recent alluvial deposits laid down by the streams.

The native growth consists of bay, ash, alder, canebrake, and water-loving plants. When cleared and brought under cultivation the soil is usually planted to corn and cotton. It proves a very good corn soil, the yield ranging from 25 to 30 bushels per acre. The low-lying portions do not give as good results with cotton as the other soils, but where the land is high enough to insure good drainage the cotton yields compare favorably with any secured in the county.

#### OCKLOCKNEE SAND.

The Ocklocknee sand is the least extensive type in the county, being confined to a few small areas along the Buttahatchee River. The soil to a depth of 8 inches is a dark-gray or light-brown medium to fine sand, rendered slightly loamy by the presence of organic matter. The subsoil consists of a medium to fine sand varying in color from light gray to yellow.

The largest area of this type is found in the ox-bow bends of the Buttahatchee River south of Hamilton. Smaller areas occur near Pearces Mill and farther up the river. It occupies a level position 10 to 15 feet above the normal level of the river, but during periods of extremely high water parts of it are flooded. This, however, is only for a short time. Owing to its proximity to the river and the porous character of the soil, the type has ample drainage throughout the entire growing season.



The original timber growth was sycamore, beech, and other trees usually found near streams. Most of this soil has been improved and is planted to the ordinary crops, no attempt being made to select those best adapted to a light soil. The yields are somewhat less than on the Ocklocknee fine sandy loam.

The results of mechanical analyses of this soil type are given in the following table:

*Mechanical analyses of Ocklocknee sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16838.....	Soil.....	0.0	4.5	31.4	53.4	1.7	7.1	1.3
16839.....	Subsoil.....	.0	6.0	25.3	59.3	2.0	5.4	2.1

#### DEKALB CLAY.

The soil of the Dekalb clay, to a depth of 8 inches, is a fine heavy loam or silty clay loam having a yellow or brownish-yellow color. Below 8 inches the material is a yellow clay loam or clay, usually mottled with gray. The subsoil has a slick, smooth, soapy feel when rubbed between the fingers. Small fragments of shale are usually present in the subsoil. The heavy texture of this soil makes it more difficult to cultivate than the other soils of the area, and great care must be taken to plow it at just the right time. When the moisture conditions are favorable the soil pulverizes readily.

The Dekalb clay is found in the eastern part of the county associated with the Glenn sandy loam. The soil is derived from a shale formation of the Carboniferous period. It overlies a sandstone formation and is frequently covered by Coastal Plain sediments or a second sandstone formation. Because of its position with reference to the other formations, much of the Dekalb clay is found on hillsides. In some places where the slope is very steep the overlying material has crept down over the shale, so that it has very little influence on the soil, and in such cases it is not shown on the map. Where the hills are less steep the influence of the formation above the shale is not so great, but is still sufficient to make the soil more sandy than the main type. Where the larger areas occur the overlying material has been eroded away and exerts no influence on the soil. Near Brilliant are a few nearly level areas where the decomposition of the shale is almost complete, and but few shale fragments are found in either soil or subsoil. In the southeastern corner of the county, below Mallards Creek, is a rough, broken area. The surface water is carried off rapidly, and owing to the somewhat impervious character of the soil there is not as much moisture retained in the soil as is needed for the best development of crops. Where unpro-

tected the surface soil has been removed, leaving the undecomposed shale exposed. This is most noticeable south of Mallards Creek.

The native forest growth consists largely of several species of oak and some hickory. Comparatively little of the Dekalb clay is improved and there is little available information as to its producing value. It would seem to be a fair corn soil, but not well suited to cotton. It is probably best adapted to pasture and forage crops. Bermuda grass would doubtless yield fair returns.

The ordinary shallow cultivation produces indifferent results on a soil having the heavy texture and close structure of the Dekalb clay. Deep cultivation will prove beneficial to a greater degree on this soil than on any other in the county, unless it be the Glenn loam. Care should be taken to increase the organic matter in the soil by plowing under cowpeas or some other soiling crop.

Below are given the results of mechanical analyses of this soil:

*Mechanical analyses of Dekalb clay.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
16828-----	Soil-----	2.8	5.3	1.1	2.4	4.6	60.0	23.1
16829-----	Subsoil----	2.0	3.0	.9	1.6	.6	54.9	36.6

#### ROUGH STONY LAND.

The areas mapped as Rough stony land in Marion County occur almost exclusively along stream courses. They are due to the presence of sandstone belonging to the Carboniferous period, which is found lying under the other formations throughout the northeastern third of the county. The streams flow through tortuous channels at the bottom of deep, narrow valleys which they have eroded in the solid sandstone. The valley walls are usually steep, rocky slopes strewn with sandstone fragments and large boulders. Frequently the stream flows against sandstone cliffs 50 to 100 feet in height. These rocky slopes are usually covered with a stunted growth of oak and other hardwoods, and some of them afford a scanty growth of grass for pasture, though on the whole the type may be said to have no agricultural value.

#### SUMMARY.

Marion County is situated in northwestern Alabama next to the Mississippi line. It has an area of 739 square miles. The county is rough and hilly, some portions of the central and northeastern parts being almost mountainous.

Marion County is still sparsely settled. There are no large towns. Hamilton is the county seat, and Guin, Winfield, and Bear Creek are

small villages located on the railroad. Birmingham and Memphis are the nearest large cities. The county is now traversed by three railroads.

Marion County has a good climate, with long, warm summers and short, mild winters. The rainfall is sufficient for all needs and is well distributed through the growing season. Cotton is the main crop, with corn the next in importance. Not enough corn is grown to supply the local needs. Oats and cowpeas are grown to a limited extent. Garden vegetables and fruit are produced for home use. Little live stock is kept in the county. Cattle and hogs are allowed to run at large over unoccupied land, as formerly.

Shallow cultivation is the rule. The preparation of the soil and the further cultivation of the crop are done with one horse and usually with the same plow. Commercial fertilizer is generally applied at the rate of 200 to 300 pounds per acre for corn and cotton. The practice of contour cultivation and terracing on the hilly land has become quite general.

Not much of the land is rented, the large majority of the farmers being landowners. Little labor is hired, and few farmers cultivate more land than can be taken care of by the family without outside help.

Improved farms sell at \$10 to \$30 an acre and unimproved land at \$2 to \$5 an acre.

Of the nine types of soil in Marion County, the Guin fine sandy loam is the most extensive and the best general farming soil. It is cultivated chiefly to cotton and corn, but is adapted to a wide range of crops.

The Guin gravelly sandy loam is associated with the Guin fine sandy loam. The surface is rough and hilly. Some areas have been cleared and cultivated, but unless carefully handled the yields diminish rapidly. Most of it is timbered land and should remain in forest.

The Glenn loam is found in the northern and eastern parts of the county on the tops of broad, dividing ridges. The surface is level to gently rolling. The greater part is still in timber. Its crop value is about the same as that of the Guin fine sandy loam.

The Glenn sandy loam occupies the greater part of a strip 4 to 10 miles wide extending north and south across the eastern part of the county. This region is very hilly and rough. Most of the type is still in forest. Crop yields on the cultivated areas are light.

The Norfolk silt loam occupies only a limited area along the Butta-hatchee River and a few other streams. It is one of the best soils in the county. Nearly all of it is under cultivation and produces good crops of corn, cotton, and oats.

The Ocklocknee fine sandy loam consists of the bottom lands along the streams. Along the small streams the surface slopes gently and the soil is quite sandy. Where it is adjacent to the large creeks it is level and poorly drained and the soil is quite loamy. It is a good corn soil and where properly drained produces good yields of cotton.

The Ocklocknee sand is confined to a few small, low-lying areas along Buttahatchee River. In times of unusually high water it is sometimes flooded for a short time. The yields of cotton and corn are somewhat less than on the Ocklocknee fine sandy loam.

The Dekalb clay, a heavy soil derived from weathered shale, occurs in the eastern part of the county. The surface varies from gently rolling to rough and hilly. Not much of it is improved.

The areas mapped as Rough stony land consist of steep, rocky slopes along the streams in the central and northern parts of the county. In many cases sandstone cliffs 50 to 100 feet in height occur in these areas. The Rough stony land has little or no agricultural value.

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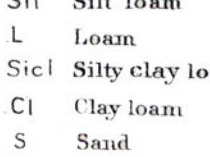
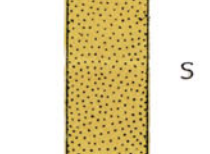
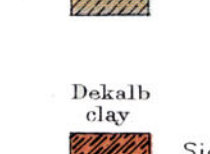
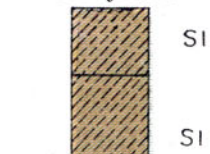
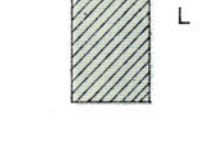
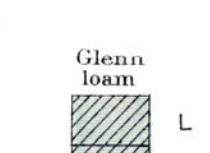
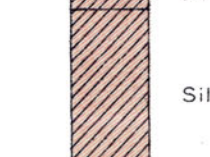
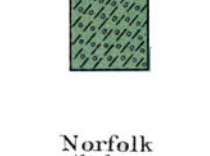
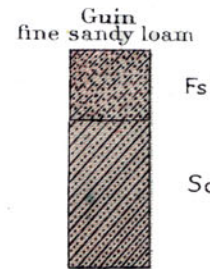
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SOIL PROFILE  
(3 feet deep)



LEGEND

